

## U3Astronomy – 24 September 2010

### News

#### The most massive star ever

Mid-July saw the announcement of the discovery of a star far more massive than ever seen before. It is estimated to weigh about 265 times the mass of the Sun, to have a diameter of over 30 x the Sun (Sun = 1.4 mln km = 4x the distance Earth-Moon!) and a brightness some 10 million times that of the Sun. Its surface temperature is about 40,000 C, more than 7 x that of the Sun. It was discovered by British astronomers working with ESA's *Very Large Telescope* on top of a mountain in the Atacama desert. The star is situated in the *Large Magellanic Cloud*, a neighbouring galaxy at about 165,000 Ly's distance. Big stars do not live long, so the star (indicated as R136a1) is supposed to have shredded already one fifth of its original mass, which at its birth – c. 1 mln years ago - must have been something like 320 solar masses. That is far more than the mass astronomers supposed to be the upper limit for a star. So the new discovery caused drastic changes in the general theories about stars.

#### Trouble at the ISS

On 31/07 the crew of the ISS were awakened by alarms indicating that an ammonia pump in one of the two coolant loops of the station had failed. As a result half of the station's cooling system was gone. Most of the scientific experiments had to be switched off, while only essential life support, communications and the station manoeuvring systems were left running. The crew were never in danger, but, of course, the failing system had to be repaired as quickly as possible. It took, however, three long space walks – totalling almost 23 hours during almost 2.5 weeks – to do the repairs. The station had four spare pumps on board, but it was much more complicated than expected to remove the failing pump and to install, on 16/08, the new pump.

#### Further news about the ISS

##### *Arrival of Russian cargo ship*

Almost two weeks ago, on 12/09, a Russian unmanned, 24 ft long (7 metres) cargo ship docked at the ISS, using its automatic pilot system. It brought 2.5 tonnes of goods to the station: food, clothing, propellant, water, oxygen and air.

##### *Short and long term future*

The next shuttle launches are planned for 1/11, 26/2 and (probably) an extra flight – really the last one – in June. From then on all contacts with the ISS will be carried out by the Russian *Soyuz* + cargo ships, until the Americans will have developed something new.

NASA and Washington are still discussing the more distant future of the ISS.

It is as good as certain that the ISS will continue until 2020 (instead of 2015), but NASA hopes for a further extension until 2028 – 30 years after the first part was launched. That is almost twice as long as originally planned. That means, of course, that the station has to be inspected in order to be sure that it will be able to survive that long. The problem is that the crew on board are not able to carry out these inspections, and that it is not possible either to bring the station back to Earth for that purpose. So engineers on the ground have to work with pieces of the materials with which the station was built, calculate the influence of the forces they're undergoing and in doing so try to find the possible weak spots. On the whole, the specialists are full of confidence that the station will be able to operate for another 10 or 20 years.

#### New exoplanets

A record number of 18 exoplanets were discovered in August. The total number at the beginning of September was 490 (first one discovered in 1995). In the beginning,

most of them were 'hot Jupiters' – enormous gas planets (=easiest to spot!). But now a planet has been found with a mass of only 1.4 times that of the Earth. Another new development is that for the first time multiple planet systems (= sort of 'solar systems') have been discovered.

